

FORM PTO-1390  
(REV. 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

12758-007001

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. § 371

U.S. APPLICATION NO. (If known, see 37 CFR 1.55)

09/763309

INTERNATIONAL APPLICATION NO. ☐

INTERNATIONAL FILING DATE

PRIORITY DATE CLAIMED

PCT/DE99/02696

27 August 1999

27 August 1998

TITLE OF INVENTION

MOBILE COMMUNICATION SYSTEM FOR CONTROLLING SETTING UP A CONNECTION

APPLICANT(S) FOR DO/EO/US

Stanislav Dzuban et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

- 1 ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. § 371 ☐
- 2 ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. § 371 ☐
- 3 ☒ This is an express request to begin national examination procedures (35 U.S.C. § 371(f)) ☐ The submission must include items (5), (6), (9) and (21) indicated below ☐
- 4 ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31) ☐
- 5 ☒ A copy of the International Application as filed (35 U.S.C. § 371(c)(2))
- a ☒ is attached hereto (required only if not communicated by the International Bureau) ☐
- b ☐ has been communicated by the International Bureau ☐
- c ☐ is not required, as the application was filed in the United States Receiving Office (RO/US) ☐
- 6 ☒ An English language translation of the International Application as filed (35 U.S.C. § 371(c)(2)) ☐
- a ☒ is attached hereto ☐
- b ☐ has been previously submitted under 35 U.S.C. § 54(d)(4) ☐
- 7 ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. § 371(c)(3))
- a ☒ are attached hereto (required only if not communicated by the International Bureau) ☐
- b ☐ have been communicated by the International Bureau ☐
- c ☐ have not been made; however, the time limit for making such amendments has NOT expired ☐
- d ☐ have not been made and will not be made ☐
- 8 ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. § 371(c)(3)) ☐
- 9 ☐ An oath or declaration of the inventor(s) (35 U.S.C. § 371(c)(4)) ☐
- 10 ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. § 371(c)(5)) ☐

## Items 11 to 20 below concern document(s) or information included:

- 11 ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98 ☐
- 12 ☐ An assignment document for recording ☐ A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included ☐
- 13 ☐ A FIRST preliminary amendment ☐
- 14 ☐ A SECOND or SUBSEQUENT preliminary amendment ☐
- 15 ☐ A substitute specification ☐
- 16 ☐ A change of power of attorney and/or address letter ☐
- 17 ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter 2 and 35 U.S.C. § 1821 - 1825 ☐
- 18 ☐ A second copy of the published international application under 35 U.S.C. § 54(d)(4) ☐
- 19 ☐ A second copy of the English language translation of the international application under 35 U.S.C. § 54(d)(4) ☐
- 20 ☐ Other items or information:

US SUPPLEMENTAL TO: 1.4 (Revision of 11-27-97) (A)

INTERNATIONAL APPLICATION NO.:

PCT/DE99/02696

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12758-007001

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21 ☐ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):**

Neither international preliminary examination fee (37 CFR 1.482)

nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO

and International Search Report not prepared by the EPO or JPO ☐ \$1000.00

International preliminary examination fee (37 CFR 1.482) not paid to

USPTO but International Search Report prepared by the EPO or JPO ☐ \$860.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO

but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ☐ \$710.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO

but all claims did not satisfy provisions of PCT Article 33(1)-(4) ☐ \$690.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO

and all claims satisfied provisions of PCT Article 33(1)-(4) ☐ \$100.00**ENTER APPROPRIATE BASIC FEE AMOUNT =****CALCULATIONS PTO USE ONLY**

\$ 860.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)) ☐

\$

**CLAIMS****NUMBER FILED****NUMBER EXTRA****RATE**

\$

Total claims - 20 =

x \$18.00

\$

Independent claims - 3 =

x \$80.00

\$

MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$270.00

\$

**TOTAL OF ABOVE CALCULATIONS =**

\$ 860.00

☐ Applicant claims small entity status ☐ See 37 CFR 1.27 ☐ The fees indicated above are reduced by 1/2 ☐

\$ N/A

**SUBTOTAL =**

\$ 860.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)) ☐

\$

**TOTAL NATIONAL FEE =**

\$ 860.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)) ☐ The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.128, 3.31) ☐ \$40.00 per property +

\$

**TOTAL FEES ENCLOSED =**

\$ 860.00

**Amount to be refunded:**

\$

**charged:**

\$

a ☒ A check in the amount of \$ 860.00 to cover the above fees is enclosed ☐b ☐ Please charge my Deposit Account No. ☐ in the amount of \$ ☐ to cover the above fees ☐  
A duplicate copy of this sheet is enclosed ☐c ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. ☐ 06-1050 ☐ A duplicate copy of this sheet is enclosed ☐d ☐ Fees are to be charged to a credit card ☐ **WARNING:** Information on this form may become public ☐ Credit card information should not be included on this form ☐ Provide credit card information and authorization on PTO-2038 ☐**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.437 (a) or (b)) must be filed and granted to restore the application to pending status ☐

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REGISTRATION NUMBER

GR 98 P 2420

## Description

Method and mobile communication system for controlling the setting-up of a connection

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The invention relates to a method and a mobile communication system for controlling the setting-up of a connection.

Mobile subscribers are able to move freely with their mobile stations even beyond the network boundaries of their home mobile radio network (roaming). However, when a subscriber is roaming into another visited mobile radio network, he cannot easily use call numbers well known to him from his home mobile radio network such as, for example, service numbers, hotline number, mailbox number, etc. since he is subject to the numbering plan applicable in that network. Even if, in principle, it is possible to reach the call number in the other network, the mobile subscriber usually dials the call number known to him from his network in order to initiate the call. However, this procedure is unsuccessful so the mobile subscriber must take elaborate additional measures.

It is known that mobile communication systems use one or more subscriber databases (home location registers), in which the subscriber data are in each case stored for each subscriber for registering the mobile subscribers in their home mobile radio network. Since the subscriber is moving between a number of radio coverage areas in the system, he is, in consequence, registered in one or more corresponding subscriber databases (visited location registers) with the subscriber-oriented data depending on his current location. It is known that an updating procedure (location update) is performed for this purpose. These subscriber databases are coupled to mobile switching centers distributed over the system, which are

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responsible for controlling the setting-up of a  
connection and for routing the connections from/to the  
mobile stations which

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are in each case located in their area of responsibility because of their current location.

It is known from SMITH, D.G. "An introduction to GSM enhancements for operator specific services (CAMEL), IEE colloquium on mobile communications towards the next millennium and beyond", 17th May 1996, XP000605991, that, in a CAMEL network, subscriber-oriented data are stored in a home mobile radio network HPLMN of a subscriber and, when the subscriber moves, are entered in a corresponding subscriber database in accordance with an updating procedure, depending on his current location.

It is the object of the present invention to specify a method and a mobile communication system by means of which it is possible to control the setting-up of a connection also for the utilization of familiar call numbers by the moving subscriber outside his home mobile radio network.

According to the invention, this object is achieved by the features of claim 1 with respect to the method and by the features of claim 9 with respect to the mobile communication system. Developments of the invention are specified in the subclaims.

On the basis of the fact that subscriber-oriented data of each mobile subscriber registered in his home mobile radio network are stored in at least one subscriber database and, when the subscriber moves, are entered in a corresponding subscriber database in accordance with an updating procedure, the subject matter of the invention provides that a subscriber number profile with call numbers generally valid for all registered mobile subscribers is stored additionally in the subscriber database of the home mobile radio network and, when the respective subscriber moves into the visited mobile radio network, is also transmitted in the updating procedure for storage in the corresponding subscriber database. Furthermore, the mobile switching center in the

- visited mobile radio network compares the call numbers of the subscriber number profile with the called party address for a mobile originated call which is initiated with a called party address dialed by the mobile subscriber, and, when they match, a connection is set up to a service control point which translates the called party address also transmitted into a new called party address and sends it back to the mobile switching center for the further setting-up of a connection.
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AMENDED SHEET

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5 The subscriber number profile with generally  
valid call numbers for all mobile subscribers  
registered in the home network according to the  
invention has the result that the call numbers familiar  
10 to the mobile subscriber can be called up not only in  
his home network but also in any other network in which  
he happens to be located, without elaborate additional  
measures by the subscriber. He behaves as if he were in  
his home network with respect to the dialing of the  
15 desired call numbers. The storage of the subscriber  
number profile applies to all subscribers so that it  
does not need to be specified, stored and loaded in the  
case of an update for each individual subscriber. The  
subscriber number profile is automatically also  
20 supplied in addition to the subscriber-oriented data  
with each update of the location due to roaming into  
another network.

25 According to an advantageous development of the  
invention, the called party address with the internal  
network call number format is translated into the new  
called party address with an international call number  
format by the service control point. This results in a  
successful, internationally valid identification of the  
call number by the service control point in the  
30 connection set-up without the subscriber noticing this  
or even having had to carry out measures for this. This  
call number which is only valid in the network  
automatically becomes an international number.

35 It is also of advantage if the generally valid  
call numbers in the subscriber number profile are  
optionally stored either with the complete number of  
call number digits or with an abbreviated number of  
call number digits and are in each case compared with  
the corresponding number of call number digits of the  
called party address. Storing the abbreviated call  
numbers offers the advantage of reducing the required  
storage space in the respective subscriber databases.

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According to another development of the invention, a service key and/or a service control point address of the service control point are stored in the subscriber number profile in addition to the generally valid call numbers and also transmitted. It is thus possible also to supply additional information which leads to a faster and/or simpler connection set-up by the mobile switching center.

The mobile communication system according to the invention exhibits memory means in the subscriber database of the home mobile radio network for additional storage of a subscriber number profile with generally valid call numbers for all registered mobile subscribers and control means in the subscriber database for transmitting the subscriber number profile in the updating procedure when the respective subscriber moves into the visited mobile radio network, and memory means in the corresponding subscriber database for storing the subscriber number profile also transmitted. Furthermore, control means for comparing the call numbers of the subscriber number profile with a called party address dialed by the mobile subscriber for a mobile originated call, which is initiated with the called party address, and for setting up a connection to a service control point when they match, are provided in the mobile switching center of the visited mobile radio network. In addition, the service control point exhibits control means for translating the called party address also transmitted into a new called party address and for sending the new called party address back to the mobile switching center for the further connection set-up.

The invention is explained in greater detail with reference to an exemplary embodiment shown in a drawing which shows the block diagram of a mobile communication system for controlling the setting-up of a connection. The example is based on a system

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according to the GSM Standard but the invention is not restricted to this. From the point of view of a mobile subscriber who uses a mobile station MS for initiating

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mobile originated calls and receiving mobile terminated calls, the mobile communication system comprises a home mobile radio network HPLMN and a visited mobile radio network VPLMN. In this arrangement, he is permanently stored with his subscriber-oriented data in a home location register HLR of the home mobile radio network HPLMN for the duration of his registration. Because of his mobility, he is also stored with his subscriber-oriented data in a visitor location register VLR of the visited mobile radio network VPLMN for the duration of a temporary stay in another radio coverage area. The switching in the radio coverage area is handled by a mobile switching center MSC which controls the connection set-up for the calls which can be received and initiated by subscribers or terminals with associated data in the visitor location register VLR. The mobile switching center MSC and the home location register HLR have a control unit CM or, respectively, CON and the home location register HLR and the visitor location register VLR in each case have a memory means MM. The mobile switching center MSC can set up a connection to a service control point SCP of an intelligent network (IN) when an IN trigger is present in the call processing. The service control point SCP has a service logic SL for controlling the IN services.

To control the setting-up of a connection according to the invention, a subscriber number profile R-CSI (roaming CAMEL service information) with generally valid call numbers for all registered mobile subscribers Sub1, Sub2 ... Subn, e.g. No1 = 1234 and No2 = 37367, is additionally stored in the home location register HLR of the home mobile radio network HPLMN in a step (1), and when the respective subscriber moves into the visited mobile radio network VPLMN, also transmitted in the updating procedure LUP (location update) for storage in the visitor location register VLR. Storage in the two subscriber databases in each

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case takes place in the memory means MM, the control unit

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CON of the home location register HLR initiating the reading-out of the memory means MM and the transmission of the subscriber number profile R-CSI in the updating procedure LUP. In the memory means MM of the home location register HLR, further information is preferably stored such as, e.g., a service key (SK) and/or a service control point address (SCP-A) of the service control point SCP. This additional information, which is defined and administered in a generally valid manner for all subscribers Sub1, Sub2 ... Subn stored in the home location register HLR, can also be transmitted in the updating procedure in addition to the subscriber-oriented data.

The generally valid call numbers No1, No2 stored in the subscriber number profile R-CSI are, for example, abbreviated call numbers which are familiar to the subscriber in his home mobile radio network HPLMN. Due to the invention, a certain service (service number) can be used or a mailbox can be called up even in the other network VPLMN, even if a different numbering plan exists there, when an abbreviated call number known to the subscriber is dialed. The generally valid call numbers No1, No2 in the subscriber number profile R-CSI are optionally stored with the complete number of call number digits or with an abbreviated number of call number digits in the memory means MM.

According to the invention, the mobile switching center MSC in the visited mobile radio network VPLMN compares the call numbers No1, No2 of the subscriber number profile R-CSI with the called party address CldPA for a mobile originated call which is initiated by the mobile subscriber with a message SU (setup) and a dialed called party address CldPA=1234 - for example an abbreviated call number -, according to step (2) in the present example. Since a match between the call number No1 and the called party address CldPA, having in each case the digit combination 1234, exists

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in the present example, this match acts as IN trigger mechanism in the mobile switching center - see step (3) -, so

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that, in consequence, the call is routed from the mobile switching center MSC to the service control point SCP. Routing according to step (4) contains a query message SCP-Q with the called party address

5 CldPA=1234 - or, respectively, the abbreviated call number Nol=1234 - to the service control point SCP, the service logic SL of which translates the received called party address into a new called party address CldPA\*+=+49 172 66666 - see step (5). After that, the

10 service control point SCP or, respectively, its service logic SL sends the new called party address CldPA\*+=+49 172 66666 back to the mobile switching center MSC for continuing the connection set-up - see step (6). In the present example, the abbreviated call

15 number CldPA=1234 which arrived at the service control point SCP and which only has validity in the home mobile radio network HPLMN with an internal network call number format in this digit combination, was translated into a long call number CldPA\*+=+4917266666

20 with an international call number format including the country code (+49) and the network code (172) which also has validity in the visited mobile radio network VPLMN.

It is assumed that the subscriber-oriented data

25 for the mobile subscriber also contain service data which provide for the utilization of an IN service and thus the routing of the call to a service point - possibly a different one from the service control points SCP. In this case, these service data are loaded

30 into the visitor location register VLR by the home location register and are evaluated by the mobile switching center MSC. Because of the presence of an IN trigger, the mobile switching center initially sets up the connection to the IN service control point. After

35 this connection has been set up, the call numbers of the subscriber number profile R-CSI are assessed with respect to a match with the called party address CldPA and a further connection is set up according to the

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above procedure to the service control point SCP shown. Sequentializing the call processing ensures that a number of contacts to service control points SCP, or, respectively, service logics SL are supported in succession

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during the connection set-up. As a result, it is advantageously possible to combine an IN service which can be individually used and entered for the mobile subscriber with the IN trigger mechanism according to the call numbers of the subscriber number profile which are generally valid for all subscribers according to the invention.

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## Patent Claims

1. A method for controlling the setting-up of a connection in a mobile communication system, wherein

5 - subscriber-oriented data of each mobile subscriber registered in his home mobile radio network (HPLMN) are stored in at least one subscriber database (HLR) and, when the subscriber moves, are entered in a corresponding subscriber database (VLR) in accordance  
10 with an updating procedure (LUP), depending on his current location,

- connections from/to a mobile station (MS) of the mobile subscriber are set up by a mobile switching center (MSC) coupled to the corresponding subscriber  
15 database (VLR),  
characterized in that

- a subscriber number profile (R-CSI) with call numbers (No1, No2) generally valid for all registered mobile subscribers is stored additionally in the  
20 subscriber database (HLR) of the home mobile radio network (HPLMN) and, when the respective subscriber moves into the visited mobile radio network (VPLMN), is also transmitted in the updating procedure (LUP) for storage in the corresponding subscriber database (VLR),  
25 and

- the mobile switching center (MSC) in the visited mobile radio network (VPLMN) compares the call numbers of the subscriber number profile (R-CSI) with the called party address (CldPA) for a mobile  
30 originated call which is initiated with a called party address (CldPA) dialed by the mobile subscriber, and, when they match, a connection is set up to a service control point (SCP) which translates the called party address (CldPA) also transmitted into a new called  
35 party address (CldPA\*) and sends it back to the mobile switching center (MSC) for the further setting-up of a connection.

2. The method as claimed in claim 1, in which the called party address (CldPA) with an internal network call number format is translated into the new called party address (CldPA\*) with an

international call number format by the service control point (SCP).

3. The method as claimed in claim 1 or 2, in which, in addition to the generally valid call numbers (No1, No2) in the subscriber number profile (R-CSI), a service key (SK) and/or a service control point address (SCP-A) of the service control point (SCP) are stored and also transmitted.

4. The method as claimed in one of the preceding claims, in which abbreviated call numbers are stored as generally valid call numbers (No1, No2) in the subscriber number profile (R-CSI).

5. The method as claimed in claim 4, in which a certain service is used by the mobile subscriber by dialing an abbreviated call number.

6. The method as claimed in claim 4 or 5, in which a mailbox is called up by the mobile subscriber by dialing an abbreviated call number.

7. The method as claimed in one of the preceding claims, in which the generally valid call numbers (No1, No2) in the subscriber number profile (R-CSI) are stored with the complete number of call number digits or with an abbreviated number of call number digits and are in each case compared with the corresponding number of call number digits of the called party address (CldPA).

8. The method as claimed in one of the preceding claims, in which

- service data are stored as subscriber-oriented data for the mobile subscriber in the subscriber databases (HLR, VLR), and

- the mobile switching center (MSC) initially evaluates the service data and sets up a call to a service control point and then the call numbers (No1, No2) of the subscriber number profile (R-CSI) are evaluated

with respect to the called party address (CldPA) and a further connection is set up to a service control point (SCP).

9. A mobile communication system for controlling
- 5 the setting-up of a connection, comprising
- at least one subscriber database (HLR) in which subscriber-oriented data of each mobile subscriber registered in his home mobile radio network (HPLMN) are stored, and a corresponding subscriber database (VLR)
  - 10 in which the subscriber-oriented data are stored in accordance with an updating procedure (LUP) in dependence on the subscriber's current location when he moves,
  - a mobile switching center (MSC) coupled to the
  - 15 corresponding subscriber database (VLR) for setting up connections from/to a mobile station (MS) of the mobile subscriber, characterized in that it exhibits the following:
    - memory means (MM) in the subscriber database
    - 20 (HLR) of the home mobile radio network (HPLMN) for additional storage of a subscriber number profile (R-CSI) with call numbers (No1, No2) which are generally valid for all registered mobile subscribers, and control means (CON) in the subscriber database
    - 25 (HLR) for transmitting the subscriber number profile (R-CSI) in the updating procedure (LUP) when the respective subscriber moves into the visited mobile radio network (VPLMN) and memory means (MM) in the corresponding subscriber database (VLR) for storing the
    - 30 subscriber number profile (R-CSI) also transmitted
    - control means (CM) in the mobile switching center (MSC) of the visited mobile radio network (VPLMN) for comparing the call numbers of the subscriber number profile (R-CSI) with a called party
    - 35 address (CldPA) dialed by the mobile subscriber for a mobile (MS) originated call which is initiated with the called party address (CldPA), and for setting up a

connection to a service control point (SCP) when they  
match, and comprising

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- control means (SL) in the service control point (SCP) for translating the called party address (CldPA) also transmitted into a new called party address (CldPA\*) and for sending the new called party address
- 5 (CldPA\*) back to the mobile switching center (MSC) for continuing the connection set-up).

Abstract

Method and mobile communication system for controlling the setting-up of a connection

The subject matter of the invention provides that a subscriber number profile (R-CSI) with call numbers (No1, No2) generally valid for all registered mobile subscribers is stored additionally in the subscriber database (HLR) of a home mobile radio network (HPLMN) and, when the respective subscriber moves into a visited mobile radio network (VPLMN), is also transmitted in the updating procedure for storage in the corresponding subscriber database (VLR). Furthermore, the mobile switching center (MSC) in the visited mobile radio network (VPLMN) compares the call numbers (No1, No2) of the subscriber number profile (R-CSI) with the called party address (CldPA) for a mobile (MS) originated connection which is initiated with a called party address (CldPA) dialed by the mobile subscriber, and, when they match, a connection is set up to a service control point (SCP) which translates the called party address (CldPA) also transmitted into a new called party address (CldPA\*) and sends it back to the mobile switching center (MSC) for the continued connection set-up).

FIG.

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**MOBILE COMMUNICATION SYSTEM FOR  
CONTROLLING SETTING UP A CONNECTION**

**CLAIM TO PRIORITY**

5           This application claims priority from German application number 19839016.5 filed on August 27, 1998 and from Patent Cooperation Treaty (PCT) application no. PCT/DE99/02696 filed on August 27, 1999.

**TECHNICAL FIELD**

10           The invention relates to a method and a mobile communication system for controlling the setting-up of a connection.

**BACKGROUND**

15           Mobile subscribers are able to move freely with their mobile stations even beyond the network boundaries of their home mobile radio network (roaming). However, when a subscriber is roaming into another visited mobile radio network, he cannot easily use call numbers well known to him  
20           from his home mobile radio network such as, for example, service numbers, hotline number, mailbox number, etc. since he is subject to the numbering plan applicable in that



network. Even if, in principle, it is possible to reach the call number in the other network, the mobile subscriber usually dials the call number known to him from his network in order to initiate the call. However, this procedure is unsuccessful so the mobile subscriber must take elaborate additional measures.

It is known that mobile communication systems use one or more subscriber databases (home location registers), in which the subscriber data are in each case located in their area of responsibility because of their current location.

It is known from SMITH, D.G. "An introduction to GSM enhancements for operator specific services (CAMEL), IEE colloquium on mobile communications towards the next millennium and beyond", 17th May 1996, XP000605991, that, in a CAMEL network, subscriber-oriented data are stored in a home mobile radio network HPLMN of a subscriber. When the subscriber moves, the data is entered into a corresponding subscriber database in accordance with an updating procedure, depending on the subscriber's current location.

#### SUMMARY

It is the object of the present invention to specify a method and a mobile communication system for controlling the

setting-up of a connection and also which enables the subscriber to utilize familiar call numbers outside of the subscriber's home mobile radio network.

According to the invention, this object is achieved using the features of claim 1 with respect to the method and using the features of claim 11 with respect to the mobile communication system. Other aspects of the invention are specified in the subclaims.

On the basis of the fact that subscriber-oriented data of each mobile subscriber registered in his home mobile radio network is stored in at least one subscriber database and, when the subscriber moves, is entered in a corresponding subscriber database in accordance with an updating procedure, the subject matter of the invention provides that a subscriber number profile with call numbers generally valid for all registered mobile subscribers is stored additionally in the subscriber database of the home mobile radio network and, when the respective subscriber moves into the visited mobile radio network, is also transmitted in the updating procedure for storage in the corresponding subscriber database. Furthermore, the mobile switching center in the visited mobile radio network compares the call numbers of the subscriber number profile with the called party address for a

mobile originated call which is initiated with a called party address dialed by the mobile subscriber. When the call numbers match, a connection is set up to a service control point which translates the called party address also  
5 transmitted into a new called party address. The new call party address is sent back to the mobile switching center for use further in setting-up of a connection.

The subscriber number profile with generally valid call numbers for all mobile subscribers registered in the home  
10 network according to the invention has the result that the call numbers familiar to the mobile subscriber can be called up not only in his home network but also in any other network in which he happens to be located, without elaborate additional measures by the subscriber. The subscriber  
15 behaves as if he were in his home network with respect to the dialing of the desired call numbers. The storage of the subscriber number profile applies to all subscribers so that it does not need to be specified, stored and loaded in the case of an update for each individual subscriber. The  
20 subscriber number profile is automatically supplied in addition to the subscriber-oriented data with each update of the location due to roaming into another network.

According to an advantageous development of the invention, the called party address with the internal network call number format is translated into the new called party address with an international call number format by a service control point. This results in a successful, internationally valid identification of the call number by the service control point in the connection set-up without the subscriber noticing this or even having had to carry out measures for this. This call number, which is only valid in the network, automatically becomes an international number.

It is also advantageous if the generally valid call numbers in the subscriber number profile are optionally stored either with the complete number of call number digits or with an abbreviated number of call number digits and are in each case compared with the corresponding number of call number digits of the called party address. Storing the abbreviated call numbers offers the advantage of reducing the required storage space in the respective subscriber databases.

According to another development of the invention, a service key and/or a service control point address of the service control point are stored in the subscriber number profile in addition to the generally valid call numbers and

are also transmitted. It is thus possible also to supply additional information, which leads to a faster and/or simpler connection set-up by the mobile switching center.

The mobile communication system according to the invention exhibits memory means in the subscriber database of the home mobile radio network for additional storage of a subscriber number profile with generally valid call numbers for all registered mobile subscribers and control means in the subscriber database for transmitting the subscriber number profile in the updating procedure when the respective subscriber moves into the visited mobile radio network, and memory means in the corresponding subscriber database for storing the subscriber number profile also transmitted. Furthermore, the mobile communication system includes control means for comparing the call numbers of the subscriber number profile with a called party address dialed by the mobile subscriber for a mobile originated call, which is initiated with the called party address, and for setting up a connection to a service control point when they match. In addition, the service control point exhibits control means for translating the called party address also transmitted into a new called party address and for sending the new

called party address back to the mobile switching center for the further connection set-up.

The invention is explained in greater detail with reference to an exemplary embodiment.

#### DESCRIPTION OF THE DRAWING

Fig. 1 shows a block diagram of a mobile communication system for controlling the setting-up of a connection.

#### DETAILED DESCRIPTION

The example of Fig. 1 is based on a system according to the GSM Standard but the invention is not restricted to this. From the point of view of a mobile subscriber who uses a mobile station (MS) for initiating mobile originated calls and receiving mobile terminated calls, the mobile communication system comprises a home mobile radio network HPLMN and a visited mobile radio network VPLMN. In this arrangement, an identity of the mobile subscriber is permanently stored with his subscriber-oriented data in a home location register HLR of the home mobile radio network HPLMN for the duration of his registration. Because of his mobility, the identity is also stored with his subscriber-oriented data in a visitor location register VLR of the

visited mobile radio network VPLMN for the duration of a temporary stay in another radio coverage area. The switching in the radio coverage area is handled by a mobile switching center MSC, which controls the connection set-up for the calls which can be received and initiated by subscribers or terminals with associated data in the visitor location register VLR. The mobile switching center MSC and the home location register HLR have a control unit CM or, respectively, CON and the home location register HLR and the visitor location register VLR in each case have a memory means MM. The mobile switching center MSC can set up a connection to a service control point SCP of an intelligent network IN when an IN trigger is present in the call processing. The service control point SCP has a service logic SL for controlling the IN services.

To control the setting-up of a connection according to the invention, a subscriber number profile R-CSI (roaming CAMEL service information) with generally valid call numbers for all registered mobile subscribers Sub1, Sub2 ... Subn, e.g. No1 = 1234 and No2 = 37367, is additionally stored in the home location register HLR of the home mobile radio network HPLMN in a step (1), and when the respective subscriber moves into the visited mobile radio network VPLMN,

also transmitted in the updating procedure LUP (location update) for storage in the visitor location register VLR. Storage in the two subscriber databases in each case takes place in the memory means MM, the control unit CON of the home location register HLR initiating the reading-out of the memory means MM and the transmission of the subscriber number profile R-CSI in the updating procedure LUP. In the memory means MM of the home location register HLR, further information is preferably stored such as, e.g., a service key (SK) and/or a service control point address (SCP-A) of the service control point SCP. This additional information, which is defined and administered in a generally valid manner for all subscribers Sub1, Sub2 ... Subn stored in the home location register HLR, can also be transmitted in the updating procedure in addition to the subscriber-oriented data.

The generally valid call numbers No1, No2 stored in the subscriber number profile R-CSI are, for example, abbreviated call numbers which are familiar to the subscriber in his home mobile radio network HPLMN. Due to the invention, a certain service (service number) can be used or a mailbox can be called up even in the other network VPLMN, even if a different numbering plan exists there, when an abbreviated



call number known to the subscriber is dialed. The generally valid call numbers No1, No2 in the subscriber number profile R-CSI are optionally stored with the complete number of call number digits or with an abbreviated number of call number digits in the memory means MM.

According to the invention, the mobile switching center MSC in the visited mobile radio network VPLMN compares the call numbers No1, No2 of the subscriber number profile R-CSI with the called party address CldPA for a mobile originated call which is initiated by the mobile subscriber with a message SU (setup) and a dialed called party address CldPA=1234 - for example an abbreviated call number - according to step (2) in the present example. Since a match between the call number No1 and the called party address CldPA, having in each case the digit combination 1234, exists in the present example, this match acts as IN trigger mechanism in the mobile switching center - see step (3) - so that, in consequence, the call is routed from the mobile switching center MSC to the service control point SCP.

Routing according to step (4) contains a query message SCP-Q with the called party address CldPA=1234 - or, respectively, the abbreviated call number No1=1234 - to the service control point SCP, the service logic SL of which translates the

received called party address into a new called party address  
CldPA\*+=+49 172 66666 - see step (5). After that, the service  
control point SCP or, respectively, its service logic SL  
sends the new called party address CldPA\*+=+49 172 66666 back  
5 to the mobile switching center MSC for continuing the  
connection set-up - see step (6). In the present example,  
the abbreviated call number CldPA=1234 which arrived at the  
service control point SCP and which only has validity in the  
home mobile radio network HPLMN with an internal network call  
10 number format in this digit combination, was translated into  
a long call number CldPA\*+=+4917266666 with an international  
call number format including the country code (+49) and the  
network code (172) which also has validity in the visited  
mobile radio network VPLMN.

15 It is assumed that the subscriber-oriented data for the  
mobile subscriber also contains service data which provides  
for the utilization of an IN service and thus the routing of  
the call to a service point - possibly a different one from  
the service control points SCP. In this case, the service  
20 data is loaded into the visitor location register VLR by the  
home location register and is evaluated by the mobile  
switching center MSC. Because of the presence of an IN  
trigger, the mobile switching center initially sets up the

connection to the IN service control point. After this connection has been set up, the call numbers of the subscriber number profile R-CSI are assessed with respect to a match with the called party address CldPA and a further connection is set up according to the above procedure to the service control point SCP shown. Sequentializing the call processing ensures that a number of contacts to service control points SCP, or, respectively, service logics SL are supported in succession during the connection set-up. As a result, it is advantageously possible to combine an IN service which can be individually used and entered for the mobile subscriber with the IN trigger mechanism according to the call numbers of the subscriber number profile which are generally valid for all subscribers according to the invention.

What is claimed is:

1. A method of controlling setting-up a connection in a mobile communication system, comprising:

storing, in at least one subscriber database, subscriber-oriented data for a subscriber registered in a home mobile radio network;

entering the subscriber-oriented data in a subscriber database when the subscriber moves; and

setting-up a connection for the subscriber with a mobile station using a mobile switching center in a visited mobile radio network, the mobile switching center being coupled to the subscriber database;

wherein:

a subscriber number profile, which contains valid call numbers for all registered subscribers, is stored in the subscriber database and, when the subscriber moves into the visited mobile radio network, the subscriber number profile is also stored in the subscriber database (VLR); and

the mobile switching center compares the call numbers from the subscriber number profile with a called party address for a call which is initiated by the subscriber and, when a call number matches the called party address, a connection is set up to a service control point which translates the called party address into a new called party

address and sends the called party address to the mobile switching center to set-up a connection.

2. The method of claim 1, wherein the called party address includes an internal network call number format that is translated, by the service control point, into the new called party address, the new called party address having an international call number format.

3. The method of claim 1, wherein, in addition to the valid call numbers, the subscriber number profile contains a service key and/or a service control point address of the service control point.

4. The method of claim 2, wherein, in addition to the valid call numbers in the subscriber number profile (R-CSI) the subscriber profile contains a service key and/or a service control point address of the service control point.

5. The of claim 1, wherein abbreviated call numbers are stored as valid call numbers in the subscriber number profile.

6. The method of claim 5, wherein a service is used by the subscriber by dialing an abbreviated call number.

7. The method of claim 6, wherein a mailbox is called by subscriber by dialing an abbreviated call number.

8. The method of claim 6, wherein a mailbox is called by the subscriber by dialing an abbreviated call number.

9. The method of claim 1, wherein the valid call numbers in the subscriber number profile are stored with a complete number of call number digits or with an abbreviated number of call number digits and are the valid call numbers are each compared with a corresponding number of call number digits of the called party address.

10. The method of claim 1, wherein:  
the subscriber-oriented data comprises service data; and  
the mobile switching center evaluates the service data,  
sets up a call to a service control point, evaluates call numbers of the subscriber number profile with respect to the called party address, and sets up a further connection to a service control point.

11. A mobile communication system for controlling setting-up of a connection, comprising:

at least one subscriber database containing subscriber-oriented data for subscribers registered in a home mobile radio network and a corresponding subscriber database containing subscriber-oriented data that is stored in accordance with an updating procedure based on a current location of the subscriber;

a mobile switching center coupled to the corresponding subscriber database for setting up connections between the subscriber and a mobile station, the mobile switching center comprising:

memory means for storing a subscriber number profile having call numbers that are valid for all registered mobile subscribers, and control means for transmitting the subscriber number profile in accordance with the updating procedure when the subscriber moves into a visited mobile radio network; and

control means for comparing call numbers from the subscriber number profile with a called party address dialed by the subscriber, and for setting up a connection to a service control point when the called

party address matches a number in the subscriber number  
profile; and

control means in the service control point for  
translating the called party address into a new called party  
5 address and for sending the new called party address back to  
the mobile switching center for continuing connection set-up.

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**MOBILE COMMUNICATION SYSTEM FOR  
CONTROLLING SETTING UP A CONNECTION**

**ABSTRACT**

5           Controlling setting-up a connection in a mobile  
communication system includes storing, in at least one  
subscriber database, subscriber-oriented data for a  
subscriber registered in a home mobile radio network,  
entering the subscriber-oriented data in a subscriber  
10       database when the subscriber moves, and setting-up a  
connection for the subscriber with a mobile station using a  
mobile switching center coupled to the subscriber database.

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20 FEB 2001

TITLE: MOBILE COMMUNICATION SYSTEM FOR CONTROLLING SETTING UP A CONNECTION

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February 20, 2001

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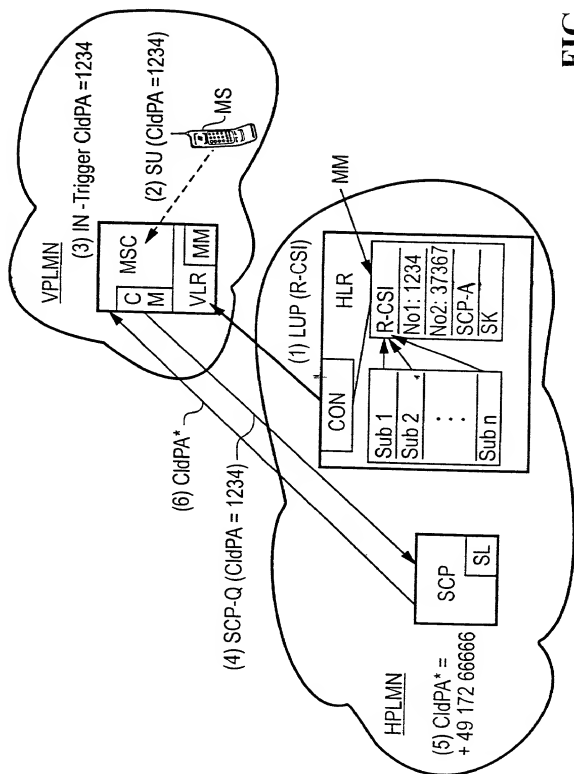


FIG. 1

# Declaration and Power of Attorney For Patent Application

## Erklärung Für Patentanmeldungen Mit Vollmacht

### German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

#### Verfahren und Mobil-Kommunikations-system zur Steuerung eines Verbindungsaufbaus

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)

☒ hier beigefügt ist.

(check one)

☐ is attached hereto.

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PCT internationale Anmeldung

PCT international application

PCT Anmeldungsnummer \_\_\_\_\_

PCT Application No. \_\_\_\_\_

eingereicht wurde und am \_\_\_\_\_

and was amended on \_\_\_\_\_

abgeändert wurde (falls tatsächlich abgeändert).

(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

076309 060701

# German Language Declaration

Prior foreign applications  
Priorität beansprucht

Priority Claimed

198 39 016.5 Germany

27. August 1998

☒

☐

(Number)  
(Nummer)

(Country)  
(Land)

(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

Yes  
Ja

No  
Nein

(Number)  
(Nummer)

(Country)  
(Land)

(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

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Yes  
Ja

No  
Nein

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Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

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(Application Serial No.)  
(Anmeldeseriennummer)

(Filing Date)  
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(patentiert, anhängig,  
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(Status)  
(patented, pending,  
abandoned)

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# German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

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